



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/983,066	10/23/2001	Joo-Hyong Lee	1607-0257P	8895

2292 7590 03/11/2004

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

PIZARRO CRESPO, MARCOS D

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 03/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/983,066	LEE ET AL.	
	Examiner	Art Unit	
	Marcos D. Pizarro-Crespo	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: 2332-0134P

Filing Date: 10/23/2001

Claimed Priority Dates: 1/21/2000 (Continuation 09/488,549)
1/22/1999 (KR 99-1909)

Applicant(s): Lee et al.

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the amendment in paper no. 7 filed on 2/10/2003.

Acknowledgment

1. The amendment filed on 12/15/2003 in response to the Office action in paper no. 12, mailed on 10/1/2003, has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-9.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 3-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim (GB 2314974).

4. Kim shows (see, e.g., figs. 4A-4D) all aspects of the instant invention including a semiconductor device comprising:

- a semiconductor substrate **40** having a first conductivity type (*i.e.*, p-type)

- twin wells **43**, **45** formed in adjacent regions of a surface portion of the substrate **40**
- a first **43** of the twin wells having a second conductivity type (*i.e.*, n-type) formed in a first portion of the substrate **40** such that, in a direction of depth, a junction exits between the first twin well **43** and the substrate **40**
- a second **45** of the twin wells having the first conductivity type formed in a second portion of the substrate **40** such that, in a direction of depth, a junction exits between the second twin well **45** and the substrate **40**

wherein the substrate **40** has no buried layer beneath the twin wells **43**, **45**.

5. Regarding claims 3 and 4, Kim shows that there are three layers of ions included in the second twin well **45**, the three layers including lower and middle layers of a retrograde well and a threshold voltage layer at the surface of the well. See, *e.g.*, pp.15/II.27-pp.16/II.12.

6. Regarding claim 5, Kim shows that there are two layers of ions included in the first twin well **43**, the two layers including a lower layer of a retrograde well and a threshold voltage layer at the surface of the well. See, *e.g.*, pp.15/II.3-23.

7. Regarding claim 6, Kim shows that the twin wells **43**, **45** are symmetric about an axis perpendicular to the surface of the substrate **40** (see, *e.g.*, fig. 4B).

8. Regarding claim 7, Kim shows the twin wells **43**, **45** having equal depths (see, *e.g.*, fig. 4B).

9. Regarding claim 8, Kim shows the first twin well **43** extending to a predetermined depth in the substrate **40**, and increasing in a second conductivity-type impurity-ion concentration in the direction of depth. See, e.g., fig. 4B, pp.15/ll.3-23.

10. Regarding claim 9, Kim shows the second twin well **45** extending to a predetermined depth in the substrate **40**, and increasing in a first conductivity-type impurity-ion concentration in the direction of depth. See, e.g., fig. 4B, pp.15/ll.27-pp.16/ll.12.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Takamura (US 5795803).

14. Kim shows most aspects of the instant invention (see paragraphs 4-10 above), but fails to show the wells having a junction depth of 1.5 μm . However, depth differences are considered obvious design choices subject to routine experimentation and optimization and are not patentable unless unobvious or unexpected results are obtained.

Takamura (see, e.g., col.4/ll.49-52), for example, teaches that junction depths should be deeper than the bottom of device isolation regions. Takamura (see, e.g., col.4/ll.54-56) further teaches that the location of the junction can be adjusted by regulating the implantation energy of the impurity ions.

Therefore, it would be an obvious matter of design choice to select suitable junction depths for Kim's wells by merely adjusting the implantation energies of the impurity ions, as taught by Takamura, since junction depths are variables of importance subject to routine experimentation and optimization and it is not inventive to discover the workable ranges. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235.

In addition, since the applicants have not established the criticality (see next paragraph) of specifically having the claimed junction depth of 1.5 μm , it would have been obvious to one of ordinary skill in the art to use this value in the device of Kim.

CRITICALITY

The specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Response to Arguments

15. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

17. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

18. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 872-9306**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

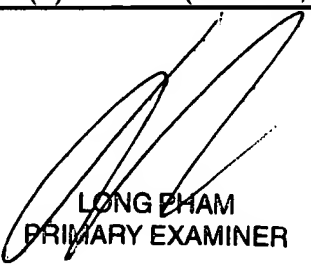
Art Unit: 2814

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(703) 308-6558** and between the hours of 9:30 AM to 8:00 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

20. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

21. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/371; 438/223,224	2/23/2004
Other Documentation: PLUS Analysis	10/1/2002
Electronic Database(s): EAST (USPAT, EPO, JPO)	2/23/2004



LONG PHAM
PRIMARY EXAMINER

Marcos D. Pizarro-Crespo
Patent Examiner
Art Unit 2814
571-272-1716
marcos.pizarro@uspto.gov